

What is claimed is:

- [Claim 1] 1. A method for calibrating grid parameters for a photolithographic tool having a wafer stage and an alignment system, the method comprising the steps:
- a. providing a plurality of artifacts on the wafer stage outside of the area where a substrate can be placed on the wafer stage, the artifacts are placed a known distance apart from each other;
 - b. measuring the distance between the artifacts with the alignment system; and
 - c. comparing the measured distance to the known distance to calibrate the grid parameters of the wafer stage.
- [Claim 2] 2. A method according to Claim 1, wherein the measuring step includes the step of:
- moving a first of the artifacts to the alignment system;
 - using the alignment system to measure the location of the first of the artifacts;
 - moving a second of the artifacts to the alignment system; and
 - using the alignment system to measure the location of the second of the artifacts.

[Claim 3] 3. A method according to Claim 2, wherein the measuring step includes the

further step of using said measurements of the locations of the first and second of the artifacts to determine the measured distance between the first and second of the artifacts.

[Claim 4] 4. A method according to Claim 1, wherein the providing step includes the

steps of:

locating a first of the artifacts on a first side of said area; and

locating a second of the artifacts on a second side of said area, said second side being opposite said first side.

[Claim 5] 5. A method according to Claim 4, wherein both of said first and second of

the artifacts are located on a common axis.

[Claim 6] 6. A method according to Claim 1, wherein:

the providing step includes the steps of

i) providing a first pair of artifacts a known distance apart from each other, and

ii) providing a second pair of artifacts a known distance apart from each other; and

the measuring step includes the steps of

- i) measuring the distance between the first pair of artifacts, and
- ii) measuring the distance between the second pair of artifacts.

[Claim 7] 7. A method according to Claim 6, wherein:

the step of providing the first pair of artifacts includes the step of locating said first pair of artifacts on a first axis, on opposite sides of said area;

the step of providing the second pair of artifacts includes the step of locating said second pair of artifacts on a second axis, on opposite sides of said area; and

said second axis is perpendicular to the first axis.

[Claim 8] 8. A method for calibrating grid parameters for a photolithographic tool

having a wafer stage and an alignment system, the method comprising the steps:

- a. positioning a wafer on the stage;

- b. providing a plurality of artifacts on the wafer stage outside of the wafer, the artifacts being a known distance apart from each other;
- c. positioning a first of the artifacts at a defined location relative to the alignment system;
- d. moving the wafer stage a predetermined distance, and forming a first structure on the wafer;
- e. positioning a second of the artifacts at a defined location relative to the alignment system;
- f. moving the wafer stage a predetermined distance, and forming a second structure on the wafer; and
- g. measuring the offset between said first and second structures to calibrate the grid parameters of the wafer stage.

[Claim 9] 9. A method according to Claim 8, wherein the step of providing the

plurality of artifacts includes the step of positioning the first and second of the artifacts on a common axis, on opposite sides of the wafer.

[Claim 10] 10. A method according to Claim 9, wherein the step of forming the second

structure includes the step of forming the second structure on top of the first structure.

[Claim 11] 11. A method according to Claim 8, wherein:

said first and second structures are spaced apart; and further comprising the steps of:

forming another pair of structures on the wafer;

measuring the distance between said another pair of structures, and using the measured distance between said another pair of structures to determine the difference between field and grid parameters; and

using the measured offset between the first and second structures to provide the grid parameters.

[Claim 12] 12. Apparatus for calibrating grid parameters for a photolithographic tool

having a wafer stage and an alignment system, the apparatus comprising:

a. a plurality of artifacts on the wafer stage outside of the area where a substrate can be placed on the wafer stage, the artifacts are placed a known distance apart from each other;

b. means for measuring the distance between the artifacts with the alignment system; and

c. means for comparing the measured distance to the known distance to calibrate the grid parameters of the wafer stage.

[Claim 13] 13. Apparatus according to Claim 12, wherein the photolithography tool further includes an alignment system, and the measuring means includes:

means for moving a first and a second of the artifacts to the alignment system;

means for using the alignment system to measure the locations of the first and second of the artifacts; and

means for using said measurements of the locations of the first and second of the artifacts to determine the measured distance between the first and second of the artifacts.

[Claim 14] 14. Apparatus according to Claim 12, wherein the first and second of the artifacts are located on a common axis, on opposite sides of said area.

[Claim 15] 15. Apparatus according to Claim 12, wherein:

the plurality of artifacts include

i) a first pair of artifacts a known distance apart from each other, on a first axis and on opposite sides of said area, and

ii) a second pair of artifacts a known distance apart from each other, on a second axis and on opposite sides of said area; and

the measuring means includes means for measuring the distance between the first pair of artifacts and the distance between the second pair of artifacts.

[Claim 16] 16. Apparatus for calibrating grid parameters for a photolithographic tool

having a wafer stage, a wafer on the wafer stage and an alignment system, the apparatus comprising:

- a. a plurality of artifacts on the wafer stage outside of the wafer, the artifacts being a known distance apart from each other;
- b. means for positioning a first and a second of the artifacts at defined locations relative to the alignment system, and for moving the wafer stage predetermined distances from said defined locations;
- c. means for forming first and second structures on the wafer, after said wafer stage has been moved said predetermined distances; and
- d. means for measuring the offset between said first and second structures to calibrate the grid parameters of the wafer stage.

[Claim 17] 17. Apparatus according to Claim 16, wherein the first and second of the

artifacts are on a common axis, on opposite sides of the wafer.

[Claim 18] 18. Apparatus according to Claim 16, wherein:

 said first and second structures are spaced apart;

 said means for forming are used to form another pair of structures on the wafer;

said measuring means are used to measure the distance between said another pair of structures, to use the measured distance between said another pair of structures to determine the difference between field and grid parameters, and to use the measured offset between the first and second structures to provide the grid parameters.